SROBERTS*, Rosalinda C. and Charles E. RIBAK, Department of Anatomy, University of California, Irvine, California. (Sponsored by Robert H. I. Blanks) An electron microscopic study of the GABAergic neurons in the central nucleus of the inferior colliculus of the rat.

Previous light microscopic studies have demonstrated the presence of glutamic acid decarboxylase (GAD) immunoreactivity in cell bodies and axon terminals in the central nucleus of the inferior colliculus (ICCN). The present study examined the ventral lateral portion of the ICCN of the Sprague-Dawley rat using antibodies against GAD and GABA to identify GABAergic neurons, dendrites and axons in electron microscopic preparations. Three of six rats received injections of colchicine into the lateral ventricle 24 hrs prior to sacrifice. All rats were perfused with buffered 4% paraformaldehyde and 0.1-0.2% glutaraldehyde. The tissue was sectioned in the coronal plane and blocks were taken from the ventral lateral portion of the ICCN in the center of the rostrocaudal axis. GAD and GABA positive axon terminals in the ICCN make symmetric synapses and contain pleomorphic vesicles. These immunoreactive terminals form synapses with immunoreactive dendrites as well as dendrites that lack immunoreactivity. Both types of dendrite are also postsynaptic to terminals that lack immunoreactivity and make asymmetric synapses. GAD and GABA positive myelinated axons are abundant throughout this region. Immunoreactive neurons are mainly small (10-15 μm in diameter) and medium-sized (15-25 μm in diameter). Small immunoreactive cells have round or oval somata, slight nuclear infoldings and often prominent nucleoli. Two to four immunoreactive terminals, some of which arise from myelinated axons, contact these somata. The proximal dendrites of these neurons are contacted by more terminals than the somata. Most immunoreactive neurons in the medium-sized and large categories have round somata, infolded nuclei and dendrites that radiate in several directions; these probably correspond to the stellate neurons of light microscopy. These data suggest that many GABAergic intrinsic neurons are present in the ICCN. Also, the numerous labeled myelinated axons suggest that some afferents are GABAergic. Supported by NIH grant NS-15669, Epilepsy Foundation of America & Klingenstein Foundation.